

REVISION OF THE GENUS *OROSIUS* DISTANT  
(HOMOPTERA : CICADELLOIDEA)



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# REVISION OF THE GENUS *OROSIUS* DISTANT (HOMOPTERA : CICADELLOIDEA)

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## SYNOPSIS

The genera *Orosius* Distant and *Nesophrosyne* Kirkaldy are redefined and their status established. Species of *Orosius* are redescribed and illustrated. A new species of *Orosius* is described.

MEMBERS of the genus *Orosius* Distant (1918b : 85) have been recognized as serious virus vectors affecting economic plants in many parts of the world ; causing considerable losses to sesamum (*Sesamum orientale* L.) in India (Vasudeva & Sahambi, 1955 and 1958), and to tomato, tobacco and lucerne in Australia (Helson, 1951a and Heinze, 1951 : 33). In India alone, the loss to sesamum through Phyllody has been estimated by Vasudeva & Sahambi (1958) as more than three and a half million pounds sterling per year. The same authors found several other crops, winter oilseeds (*Brassica* spp.), sanhemp (*Crotalaria juncea* L.), gram (*Cicer orientum* L.), berseem (*Trifolium alexandrinum*) and many others, susceptible to the virus disease carried by the same vector. The importance of *Orosius argentatus* (Evans, 1938b : 15) was recognized even earlier (vide Oman, 1949a : 11) as virus vector of tomato big bud and tobacco yellow dwarf.

In spite of their economic importance, the identity of the virus vectors belonging to this group was not clearly understood. Thus they have been known by different names, *Nesaloha cantonis* Oman (1943b : 33), *Deltocephalus* sp. (Vasudeva & Sahambi, 1958), *Orosius argentatus* (Evans, 1938b) (Day & McKinnon, 1951) and *Nesophrosyne* (*Orosius*) *lotophagorum* Kirkaldy (Linnavuori, 1960a : 56). Evans (*in litt.*) has expressed doubt as to whether differences between these should be regarded as of specific significance. Other species, such as *Orosius albicinctus* Distant (1918b : 85), *Thamnotettix cellulosa* Lindberg (1927c : 90), *Thamnotettix filigranus* Haupt (1927a : 30), *Thamnotettix canberrensis* Evans (1938b : 15) and *Orosius maculatus* Singh-Pruthi (1930a : 67) are also involved. There was, thus, a need for re-describing various species as well as for establishing their correct generic relationships.

Distant (1918b : 85) described *Orosius*, with *Orosius albicinctus* Distant as the type-species by monotypy. Later only two other species were described in *Orosius*. These are *Orosius maculatus* Pruthi (1930a : 67) and *Orosius santali* Pruthi (1934a : 25). *Orosius maculatus* Pruthi has been designated the type-species of *Pruthiorosius* by the writer (Ghauri, 1964 : 559). *Orosius santali* Pruthi was not available for the present study. Haupt (1927a : 30, *T. filigranus*) and Lindberg (1927c : 90, *T. cellulosa*) described one species each under *Thamnotettix* and Evans (1938b : 15) added two more species *T. argentatus* and *T. canberrensis*. Oman (1943b : 33) described another species *Nesaloha cantonis*, referable to *Orosius*. Oman (1949a :

11, 15) transferred *T. argentatus* Evans to *Orosius* and said that this species occurs on many central Pacific islands, the Philippines and Malaya in addition to Australia. He further thought that it was unlikely that the species was native to Australia, but was probably introduced there from India and that it might be the same as one of the species described by Distant or Pruthi from India. Dlabola (1952b : 34) transferred *T. filigranus* Haupt from *Thamnotettix* to *Orosius*. During 1955 the Indian *Orosius* sp. damaging sesamum was called *Deltocephalus* sp. (Vasudeva & Sahambi, 1955 : 126). Lindberg (1958 : 176) transferred his species *T. cellulosa* from *Thamnotettix* to *Nesophrosyne* and added Cape Verde Island to the original distribution (Sudan) of this species. Linnavuori (1960 : 320) synonymized *Orosius* Distant and *Nesaloha* Oman with *Nesophrosyne* Kirkaldy (1907h : 160) as well as transferring *O. argentatus* (Evans) from *Orosius* to *Nesophrosyne*. He also described a new variety, *Nesophrosyne argentatus* var. *distans* (p. 322). Soon after, Linnavuori (1960a : 56) considered *Orosius* Distant as only a subgenus of *Nesophrosyne* and also synonymized *O. argentatus* (Evans) with *Allygus lotophagorum* Kirkaldy (1907d : 62), transferring the latter from *Allygus* to *Nesophrosyne*. In both of his studies (1960 : 321 and 1960a : 56) the figures of male genitalia belong to *O. lotophagorum* (Kirk.), but the comparative remarks about the external appearance (1960 : 322) apply to *O. argentatus* (considered by him as the nominate form) and *O. lotophagorum* (Kirk.). The variety *N. argentatus distans* Linnavuori proved to be *O. lotophagorum* (Kirk.). Emeljanov (1962) accepted the synonymy *Nesophrosyne* Kirkaldy (= *Orosius* Distant) and included these with other genera, *Hishimonus* Ishihara (1953b : 11 and 38), *Satsumanus* Ishihara (1953a : 193) *Nesophryne* Kirkaldy (1907h : 160), *Nicolaus* Lindberg (1958 : 176), *Navaia* Linnavuori (1960a : 52) and *Opsianus* Linnavuori (1960 : 316) in the Subtribe *Opsina* Em. of the Tribe *Opsini* Em. However, the definition of the Subtribe *Opsina* does not seem to hold good if the character of the eye is taken into account. The "hollow" is present in the type of *O. albicinctus* Distant whereas it is absent in the type of *Nesophrosyne perkinsi* Kirkaldy and the type of *Hishimonus* (= *Eutettix*) *disciguttus* Walker (1957b : 172 as *Acocephala*); all three species being the type-species of their respective genera.

This work would not have been accomplished without the help rendered by the following persons and institutions. The writer takes this opportunity to acknowledge with grateful thanks their assistance for making available material for this study. Dr. J. W. Evans, Director of the Australian Museum, Sydney, Australia; The Director, Zoological Survey of India, Calcutta; Dr. J. P. Kramer and Dr. J. F. Clarke, U.S. National Museum, Washington, D.C., U.S.A.; Bernice P. Bishop Museum, Honolulu, Hawaii; Dr. R. Linnavuori, Finland; Dr. H. J. Muller, Quedlinburg, East Germany; Dr. E. Swirski, The Hebrew University, Israel. The writer's warmest thanks are tendered to Mr. J. P. Doncaster, Keeper of the Department of Entomology in the British Museum (Natural History), London, for the facilities provided for studying the types of several species of Cicadellidae in the collection of the Museum.

The writer suspects that *Thamnotettix puellus* Melichar (1911a : 106) might belong to *Orosius*, but as the type could not be traced either at Museum National d'Histoire

Naturelle, Entomologie, Paris, or at Moravské Museum, Brno, this cannot be decided definitely. Help given by Dr. A. Villiers of the Museum National, Paris and Dr. J. Stehlik, of Moravské Museum, Brno, in establishing the fact that the type of *T. puellus* Melichar is untraceable is gratefully acknowledged.

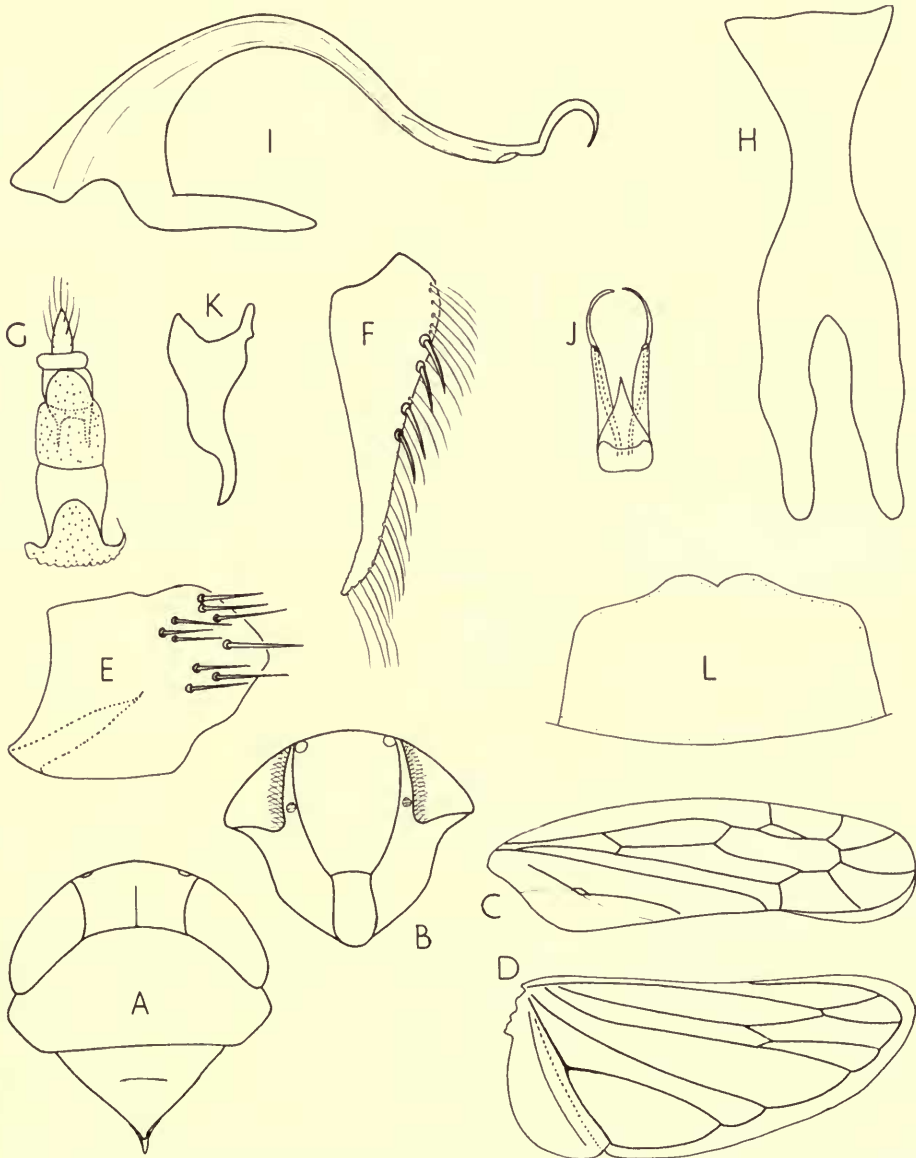


FIG. 1. *Nesophrosyne perkinsi* (Kirkaldy). Holotype ♂ and paratype ♀; for explanation of figures, see p. 252.



**NESOPHROSYNE** Kirkaldy

(Text-fig. 1)

*Nesophrosyne* Kirkaldy, 1907h : 160.Type-species : *Eutettix perkinsi* Kirkaldy, 1904a : 178.

Moderately robust leaf-hoppers with pale yellow body colour.

*Head* : *vertex* with anterior and posterior margins subparallel, *frons* proportionately broader, width equal to about three-fourths of length, lateral margins not sinuate; *clypeus* with lateral margins subparallel, elongate; *eyes* without "hollow" next to base of antennae; *ocelli* on junction of vertex and frons, visible dorsally as well as ventrally.

*Pronotum* : as wide as head, with anterior margin convex and posterior margin straight, lateral margins angled; *scutellum* wider at base than median length; *tegmen* appendiculate, claval veins branches not well defined, external subapical cell petiolate on both ends, internal subapical cell narrowed in middle; *wing* with typical Deltocephaline venation as shown in Text-fig. 1.

♂ *genitalia and anal tube* : *pygofers* with fewer (about 10) macrosetae located on posterior half of lateral lobe, setae nearer margin extended beyond it; *subgenital plates* elongate triangular, anteriorly broad, posteriorly gently narrowed, not ending in a finger-like process, external margin with four or five macrosetae and numerous fine and long hair-like setae; *basal plate* more or less "Y"-shaped, apex wide, visibly separated from arms by a narrow stem, arms almost parallel; *parameres* with well developed apodeme, apex produced but not hooked; *aedeagus* with two gonopores, base pear-shaped, posteriorly produced on dorsal side to join anal tube, two-branched, branches converging, each arising independently from base and carrying a passage opening through a gonopore beyond which apex of branch is produced as a narrow, hooked process; *anal tube* very long, dorsally not entirely membranous, with a wide, well sclerotized band, laterally and ventrally sclerotized.

**OROSIUS** Distant

(Text-fig. 2)

*Orosius* Distant, 1918b : 85.Type-species : *Orosius albicinctus* Distant, 1918b : 85.

Small leaf-hoppers, usually with irregular transverse series of small dark brown spots, markings and striations on head, thorax and tegmen giving a filigreed aspect to the whole coloration.

*Head* : *vertex*, shape variable within certain limits, from a condition with anterior and posterior margins subparallel to one where anterior margin is conically produced, gently but narrowly curving into frons; *frons* proportionately narrow, width never more than five-eighths of length, with sides usually sinuate in middle, moderately convex; *clypeus* with subparallel sides, elongate; *eyes* with "hollow" near base of antennae; *ocelli* located on border between vertex and frons, visible on dorsal side, on vertex as well as on ventral side on frons.

*Pronotum* : as wide as head, anterior margin convex, basal margin straight or only gently concave, lateral margins not straight, gently angled; *scutellum* wider at base than median length; *tegmen* appendiculate, *clavus* with branched claval vein, external subapical cell never petiolate on both ends, internal subapical cell narrowed in middle; *wing* with typical Deltocephaline venation as shown in Text-fig. 2.

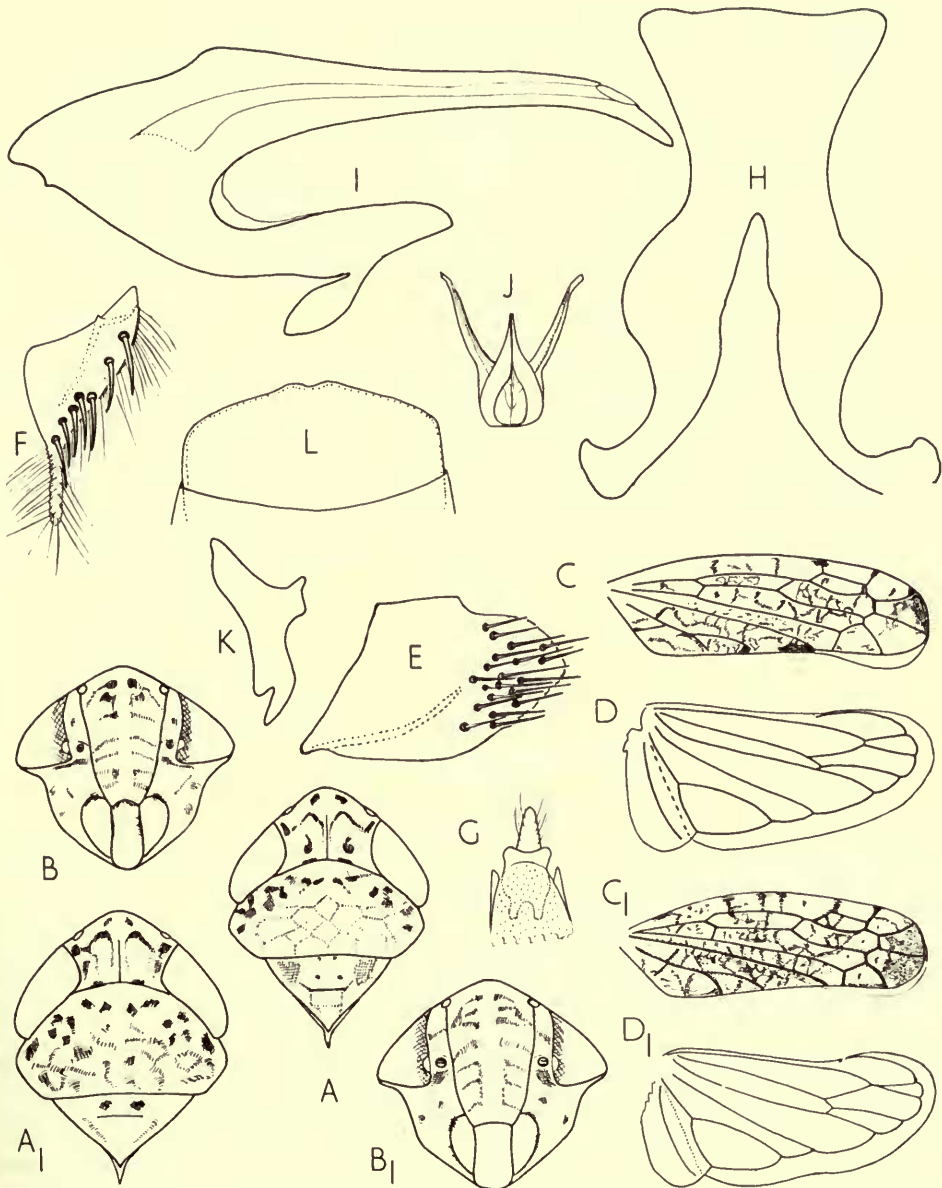


FIG. 2. *Orosius albicinctus* Distant. Holotype ♀ and Indian ♂; A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub>, D<sub>1</sub> and L belong to holotype female, the remaining to Indian male; for explanation of figures, see p. 252.

♂ *genitalia and anal tube* : *pygofers* with several (11–20) moderately long macrosetae located on posterior half of lateral lobes, setae not arranged in regular rows, apices of those farthest behind extended beyond posterior margin of pygofers; *subgenital plates* triangular, basally broad, posterior half abruptly narrowed and produced in a finger-like process, external margin with a row of 5–8 macrosetae, limited to only anterior broader part, and numerous fine and very long hair-like setae covering entire external margin of subgenital plate as well as internal margin of finger-like process; *basal plate* more or less “Y”-shaped with narrow or broad apex, sometimes very short and in form of a “U” rather than a “Y”, arms subparallel or diverging; *paramere* with well developed apodeme, apex more or less hooked; *aedeagus* with two gonopores, base pear-shaped, produced posteriorly on dorsal side where it is joined to anal tube, two-branched, branches parallel or diverging or slightly converging, each branch arising independently from base carrying a passage opening through a gonopore beyond which apex of branch, in some species, is narrowly produced but never hooked; *anal tube* of moderate length, basally membranous, except in some specimens where there is a very weakly sclerotized dorsal narrow stripe, on lateral and ventral sides sclerotized.

*Orosius* very closely resembles *Nesophrosyne*, but the structure of anal tube, shape of subgenital plate and to some extent the shape of frons, paramere and that of aedeagus separate the two genera. The anal tube in *Nesophrosyne* is dorsally partly sclerotized, whereas in *Orosius* it is almost entirely membranous, posteriorly the subgenital plate is not narrowed in form of a finger in *Nesophrosyne* as it is in *Orosius*, the hooked process at the apex of each branch of aedeagus is only present in *Nesophrosyne perkinsi*. These differences, apart from some minor ones in venation and the shape of the paramere, are sufficient for regarding *Nesophrosyne* and *Orosius* as two distinct genera.

### *Orosius albicinctus* Distant

(Text-figs. 2, 3)

*Orosius albicinctus* Distant, 1918b : 85.

*Thamnotettix filigranus* Haupt, 1927a : 30. **syn. n.**

*Coloration* : body pale ochraceous with dark brown and black mottlings and irregular striations; vertex with two spots near anterior margin, two similar spots near posterior margin, two near inner margin of each eye and a curved line in form of an irregular inverted “V” on each side of median line, dark brown; eyes dark brown; ocelli yellowish red; frons with transverse dark striations; irregular dark markings on other parts of face; pronotum with a series of dark spots near anterior margin and a network of dark striations on disc; scutellum with two dark prominent black spots near base in addition to a few more irregular dark markings; remaining parts of thorax above black; on ventral side pale ochraceous with dark spots; tegmen greyish white with prominent black spots near costal, apical and posterior margins and irregular criss-cross dark striation covering whole surface; legs pale ochraceous with black spots on all segments; abdomen above and below black with pale ochraceous margins marked with dark spots; genital segments in both sexes pale ochraceous with very few faintly dark brown markings. In ♂, markings are darker than in ♀.



MEASUREMENTS in mm.

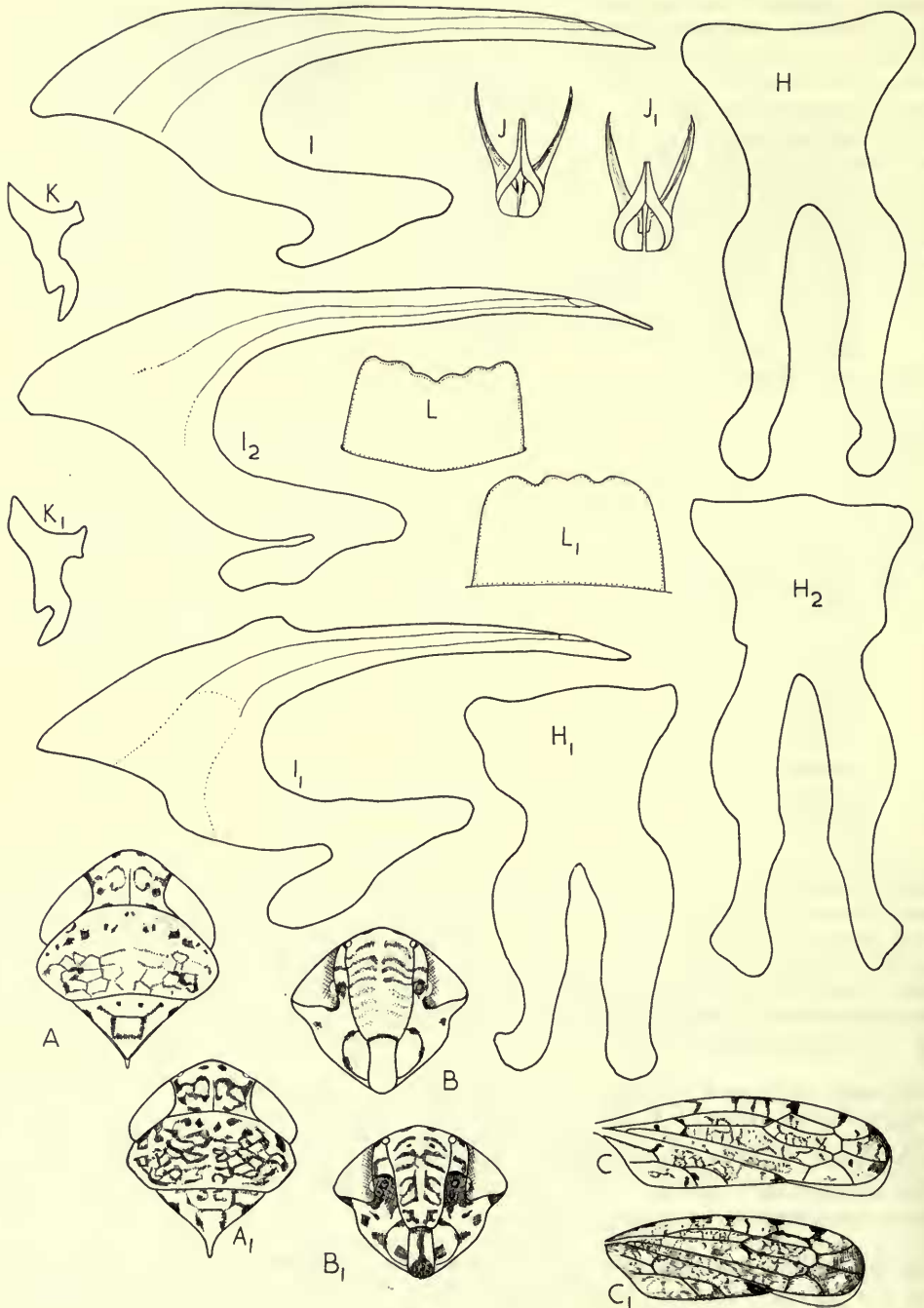
	Females			
	Indian	Middle Eastern and African		
		Holotype of <i>O. albicinctus</i>	Holotype of <i>T. filigranus</i>	From Egypt
Width across eyes	0.81-0.88	0.86	0.92	0.91
Width between eyes	0.31-0.37	0.34	0.37	0.38
Median length of vertex	0.27-0.29	0.28	0.30	0.32
Length of frons	0.55-0.55	0.59	0.59	0.61
Maximum width of frons	0.34-0.37	0.36	0.41	0.41
Width of pronotum	0.81-0.88	0.88	0.92	0.91
Median length of pronotum	0.41-0.43	0.44	0.47	0.47
Width at base of scutellum	0.47-0.47	0.47	0.51	0.54
Median length of scutellum	0.30-0.34	0.34	0.35	0.37
Length of tegmen	2.05-2.63	2.58	2.66	2.66
Body length	2.63-3.21	3.21	3.29	3.29

	Males			
	Indian	Middle Eastern and African		
		Topotypic of <i>T. filigranus</i>	From Egypt	From Uganda
Width across eyes	0.78-0.79	0.81	0.84	0.81
Width between eyes	0.31-0.34	0.32	0.34	0.34
Median length of vertex	0.27-0.25	0.27	0.27	0.27
Length of frons	0.49-0.49	0.54	0.52	0.51
Maximum width of frons	0.34-0.34	0.34	0.32	0.34
Width of pronotum	0.78-0.78	0.81	0.84	0.84
Median length of pronotum	0.37-0.40	0.44	0.43	0.42
Width at base of scutellum	0.47-0.42	0.44	0.43	0.45
Median length of scutellum	0.30-0.30	0.32	0.34	0.32
Length of tegmen	2.23-2.23	2.37	2.37	2.37
Body length	2.71-2.82	2.90	2.90	2.90

Tegmen with appendix wide. Pygofer with numerous setae. Basal plate with apex broadly triangular and arms sub-parallel or diverging; aedeagus with diverging branches whose apices in some specimens turn further outwards; other parts of male genitalia as figured; ♀ VII sternum, posterior margin not very constant in outline, but always with a central notch, laterally more or less sinuate as figured. In a large collection of females from Rajasthan, India, it was noticed that those females which had not oviposited showed only the median emargination in the posterior margin of the VII sternum, but others which had started ovipositing, the lateral notches, in addition to the median one, were present.

Material examined. INDIA: The holotype ♀ of *O. albicinctus* is from Kodaikanal, S. India, B.M. (N.H.). It has been possible to match other specimens from Delhi, both ♀ and ♂, with the holotype. Rajasthan, Jaipur, at light, ♀, 12.vi.65, *Dept. Agric.*, B.M. (N.H.); New Delhi, on *Sesamum orientale* L., ♂, ♀, ix-x.1954 (*H. S. Sahambi*).

PALESTINE: ♀ holotype of *Thamnotettix filigranus* Haupt, Ben-Shemen, 7-8.v.1926, det. Haupt, *Hpt.*, [on loan from Dr. J. H. Muller, Quedlinburg, E.



Germany]; 372 (5), Rahovet, 1 ♂, 28.vii.1957 (*Michaeli*) [presented to B.M. (N.H.) by Dr. E. Swirski, The Hebrew University, Israel]; Jericho, at light, ♂, ♀, 16.vii.1929 (*J. Tapukhi*), B.M. (N.H.).

EGYPT: Giza, on Cotton, ♂, ♀, v-vi.1961; Siwa, ♂, ♀, 8, 15, 28.v.1935 (*J. Omer Cooper*), Armstrong College Exped., B.M. (N.H.).

UGANDA: Kampala, on Sim-Sim, 1 ♂, 1 ♀, 21.vii.1933 (*H. Hargreaves*), B.M. (N.H.).

Recently Linnavuori (1964: 336, 350) recorded *N. (O.) filigranus* (Haupt) from Egypt and considered it to be of Eremian origin. As is shown here *Orosius filigranus* (Haupt) is a synonym of *O. albicinctus* Dist. and has a much wider distribution including the Oriental region.

Although the ♀ holotype of *O. albicinctus* is smaller than the ♀ holotype of *T. filigranus*, other ♀ and ♂ from India are not much smaller than those from the Middle East and Africa (vide Table, p. 237). In addition to size, there is some variation in colour also, e.g., both ♂ and ♀ from Uganda show darkening of pattern, especially on the head and the tegmen (vide A<sub>1</sub>, B<sub>1</sub>, and C<sub>1</sub>, Text-fig. 3). Since the ♂ genitalia do not show appreciable differences, all the specimens from various localities studied here are considered to belong to *O. albicinctus* Distant.

### *Orosius cellulosa* (Lindberg)

(Text-fig. 4)

*Thamnotettix cellulosa* Lindberg, 1927c: 90.

*Nesophrosyne cellulosa* (Lindberg), 1958: 176.

*Coloration*: very similar to *O. albicinctus* Distant; vertex and pronotum with fewer dark markings, frons and other parts of face with faint markings; vertex, face and legs with red spots.

*Measurements in mm. of ♂ and ♀*: head, width across eyes 0.79 (♀ 0.88), width between eyes 0.29 (0.31), median length of vertex 0.26 (0.31), length of frons 0.51 (0.57), maximum width of frons 0.37 (0.38); width of pronotum 0.74 (0.88), median length of pronotum 0.41 (0.47), width at base of scutellum 0.46 (0.51), median length of scutellum 0.30 (0.34), length of tegmen 2.23 (2.50); body length 2.76 (3.02).

Tegmen with wide appendix; pygofers with about 13 setae; basal plate with rectangularly narrow apex and slightly diverging long arms; aedeagus with subparallel lateral branches which curve inwards apically, sinuate in lateral view; other parts of ♂ genitalia as figured; ♀ VII sternum, posterior margin convex with a central depression.

Material examined. BRITISH SUDAN: Paratypes, Khartoum, sucking human blood, 1 ♂, 1 ♀, 17.ix.24 (*Well. T. R. Labs.*), in B.M. (N.H.).

Superficially *O. cellulosa* resembles *O. albicinctus*, but the shape of basal plate and the aedeagus are sufficient to differentiate it from the latter. The rectangular apex

FIG. 3. *Orosius albicinctus* Distant. Geographical variation. Holotype ♀ and topotypic ♂ of *T. filigranus* Haupt (a synonym of *O. albicinctus*), ♂ and ♀ from Uganda and ♂ from Egypt of *O. albicinctus*. A, B, C and L belong to holotype ♀; H, I, J and K to topotypic ♂; A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub>, H<sub>1</sub>, I<sub>1</sub>, J<sub>1</sub> and K<sub>1</sub> to ♂ and L<sub>1</sub> to ♀ from Uganda; H<sub>2</sub> and I<sub>2</sub> to ♂ from Egypt. For explanation of figures, see p. 252.

of basal plate and the subparallel lateral branches of the aedeagus bring it very close to the Far Eastern species, *O. argentatus* (Evans) and others, but the sinuate shape of lateral branches of the aedeagus of *O. cellulosa* is different from all others.

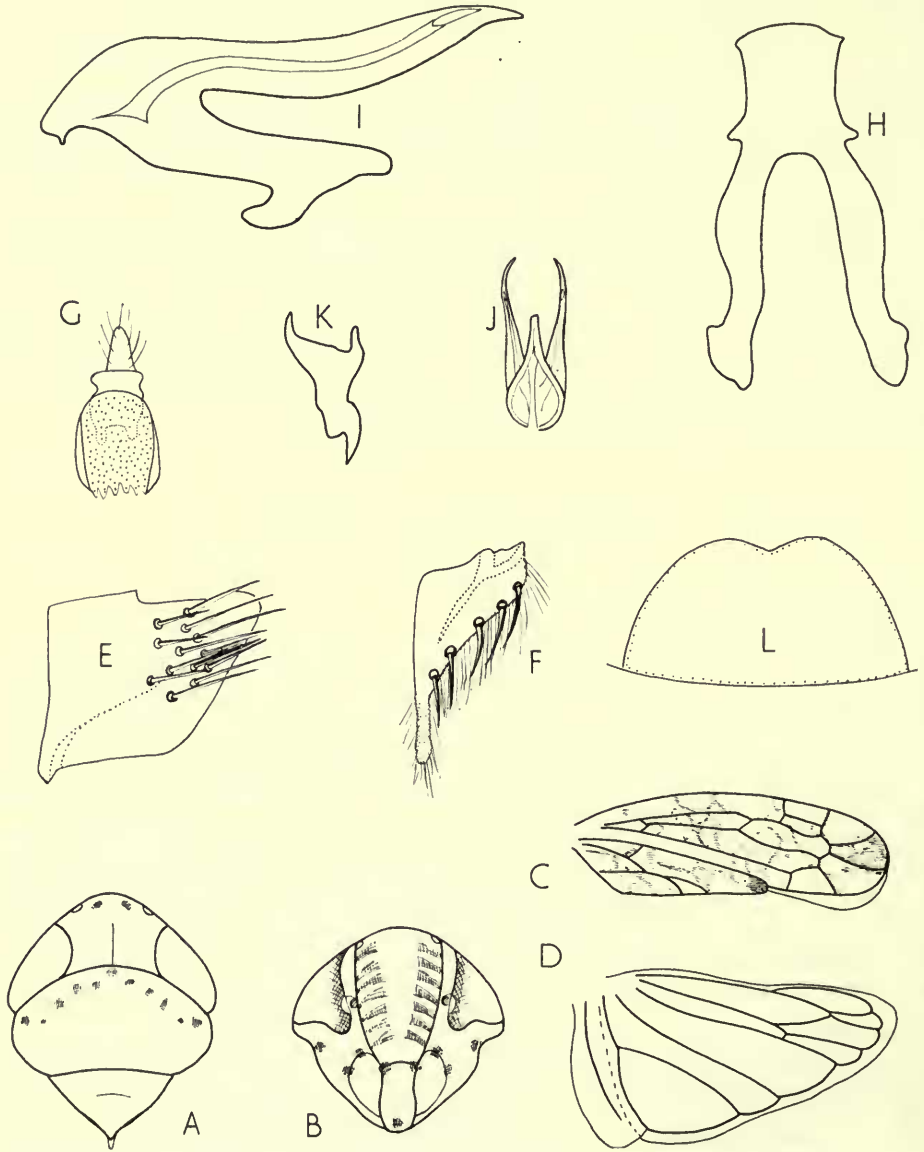


FIG. 4. *Orosius cellulosa* (Lindberg). Paratype ♂ and ♀; for explanation of figures, see p. 252.

*Orosius lotophagorum* (Kirkaldy)

(Text-fig. 5)

*Allygus lotophagorum* Kirkaldy, 1907d : 62.

*Nesophrosyne* (*Orosius*) *lotophagorum* (Kirkaldy) Linnavuori, 1960a : 57.

*Thamnotettix argentatus* Evans ; Linnavuori, 1960a : 57.

*Nesophrosyne argentatus* (Evans) ; Linnavuori, 1960 : 320.

*Nesophrosyne argentatus* var. *distans* Linnavuori, 1960 : 322. **syn. n.**

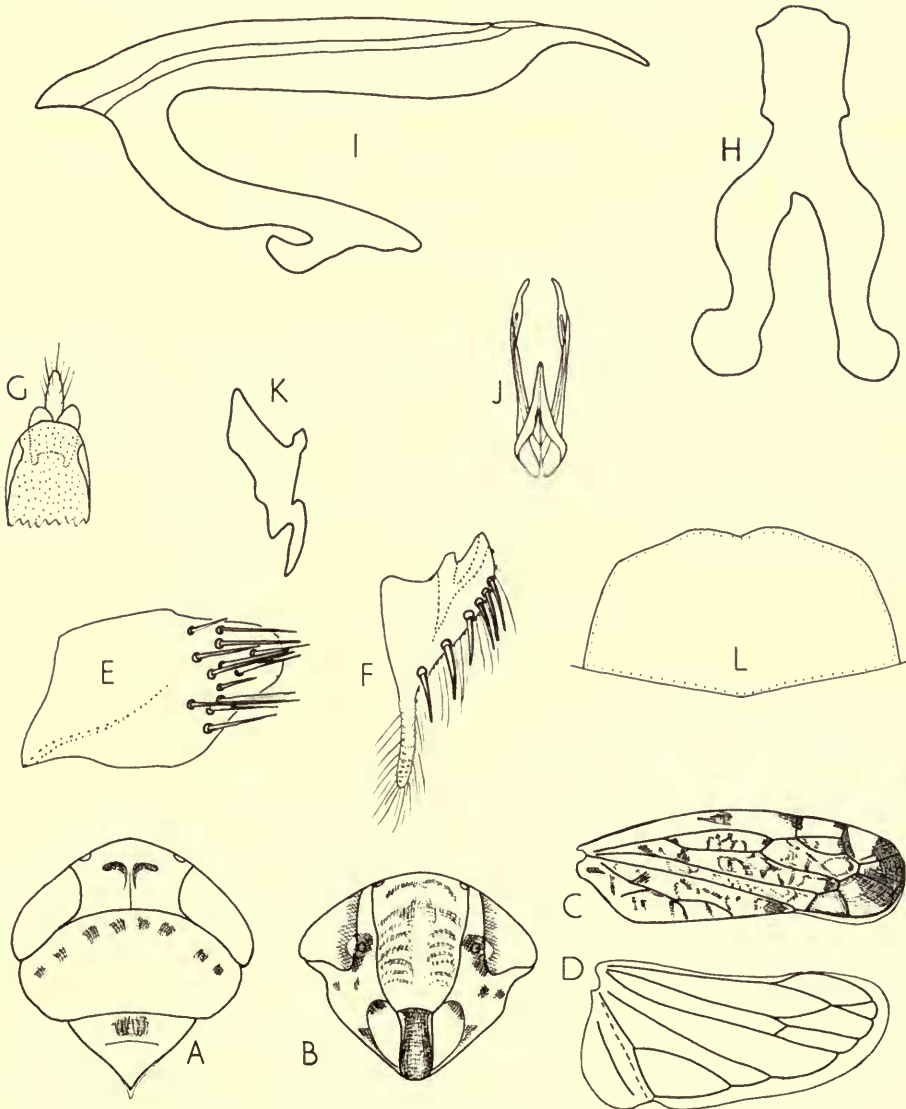


FIG. 5. *Orosius lotophagorum* (Kirkaldy). ♂ and ♀; for explanation of figures, see p. 252.



*Coloration* : basically of the same pattern as that of *O. albicinctus* Distant ; individuals showing light to dark and more or less extensive markings ; ocelli red.

*Measurements in mm. of male and* (♀) : head, width across eyes 1.00 (0.98–1.10), width between eyes 0.36 (0.34–0.41), median length of vertex 0.29–0.300 (0.32–0.34), length of frons 0.55 (0.57–0.58), maximum width of frons 0.42 (0.41–0.44) ; width of pronotum 0.95 (0.88–0.95), median length of pronotum 0.42–0.44 (0.44), width at base of scutellum 0.54–0.56 (0.57), median length of scutellum 0.35–0.37 (0.35–0.36), length of tegmen 2.31 (2.50) ; body length 3.00 (3.10).

Body robust, this difference appreciable from *O. albicinctus* Distant ; tegmen with very narrow appendix ; pygofers with numerous setae ; basal plate with rectangularly narrow apex and subparallel arms ; aedeagus with lateral branches subparallel, their apices turned inwards, in lateral view the shaft wide for most of its length, but abruptly narrowed and drawn out in form of a long process beyond gonopore ; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin convex with a shallow depression in centre and slight depressions on sides of latter.

Material examined. FIJI : Ovalau 1 ♂, 2 ♀, 19.x.24 (*E. H. Bryan Jr.*), det. as *Nesophrosyne argentatus distans* Linnavuori, Bishop Museum Honolulu, Hawaii.

WAKE IS. : Sesuvium, ♂, ♀, 28.vii.23 and 30.vii.23, (*E. H. Bryan Jr.*), some det. as *Nesophrosyne argentatus distans* Linnavuori, Bishop Museum, Honolulu, Hawaii and from Dr. R. Linnavuori, Finland.

*O. lotophagorum* Kirkaldy resembles other members of the genus *Orosius* superficially and sometimes has been confused with *O. argentatus* (Evans) but its body, especially the head and the pronotum, are appreciably robust compared with the more or less slender form of *O. argentatus*. The appendix of its tegmen on the other hand is the narrowest amongst the species of the genus *Orosius*. Internally, the most characteristic feature of *O. lotophagorum* is the shape of its aedeagus ; viewed laterally the sudden narrowing of its apex should be sufficient to distinguish it from all other species.

### *Orosius argentatus* (Evans)

(Text-fig. 6)

*Thamnotettix argentatus* Evans, 1938b : 15.

*Thamnotettix argentatus* Evans ; Evans, 1940c : 3 and 11.

*Orosius argentatus* (Evans) Oman, 1949a : 11.

*Coloration* : general colour pattern similar to *O. albicinctus* Distant, dark brown markings more pronounced on head, thorax and abdomen. Ocelli reddish in colour.

*Measurements in mm. of ♂ and* (♀) : head, width across eyes 0.78–0.81 (0.88–0.91), width between eyes 0.30–0.34 (0.35–0.37), median length of vertex 0.24–0.26 (0.25–0.28), length of frons 0.47 (0.54), maximum width of frons 0.34 (0.35–0.38) ; width of pronotum 0.78–0.81 (0.86–0.88), median length of pronotum 0.40–0.41 (0.41–0.44), width at base of scutellum 0.42–0.47 (0.43–0.49), median length of scutellum 0.30 (0.30–0.34), length of tegmen 2.10–2.21 (2.37–2.76) ; length of body 2.63–2.74 (2.90–3.29).

*O. argentatus* is more delicate than its two sympatric species, *O. lotophagorum* (Kirkaldy) and *O. canberrensensis* (Evans). Tegmen with wide appendix ; pygofers with numerous setae ; basal plate with rectangularly narrow apex and almost parallel arms ; aedeagus with lateral arms almost parallel to each other, with their apices curving inwards, in lateral view gradually narrowed, without terminal process, other parts of ♂ genitalia as figured ; ♀ VII sternum, hind margin more or less similar to that of *O. filigranus* Haupt holotype ♀, as shown in Text-fig. 6, L.



FIG. 6. *Orosius argentatus* (Evans). ♂ and ♀; for explanation of figures, see p. 252.

Material examined . AUSTRALIA : Musgrave Ra (S.A.), 1 ♂, 2 ♀, vi.61 (*H. Cogger*) ; Broken Hill, N.S.W., 2 ♂, 2 ♀, iii.1924 (*F. W. Shepherd*), Australian Museum, Sydney ; Burnley, Vic., on weeds, 1 ♂, 3 ♀, x.30 (*J. Evans*) ; Blundale, F. C. T., 1 ♂, 1 ♀, 7.i.30 (*J. Evans*) ; Lockyer, 1 ♂, 1 ♀, ex lucerne, 25.vii.39 (*D. O. A.*), B.M. (N.H.) ; Canberra, ♀, 11.vi.46 (*A. V. Hill*) ; Cronula, N. S. Wales, ♀, xii.1924 (*H. Petersen*), det. as *Nesaloha cantonis* Oman = *Th. argentatus* Evans ?, U.S. Nat. Mus. Washington.

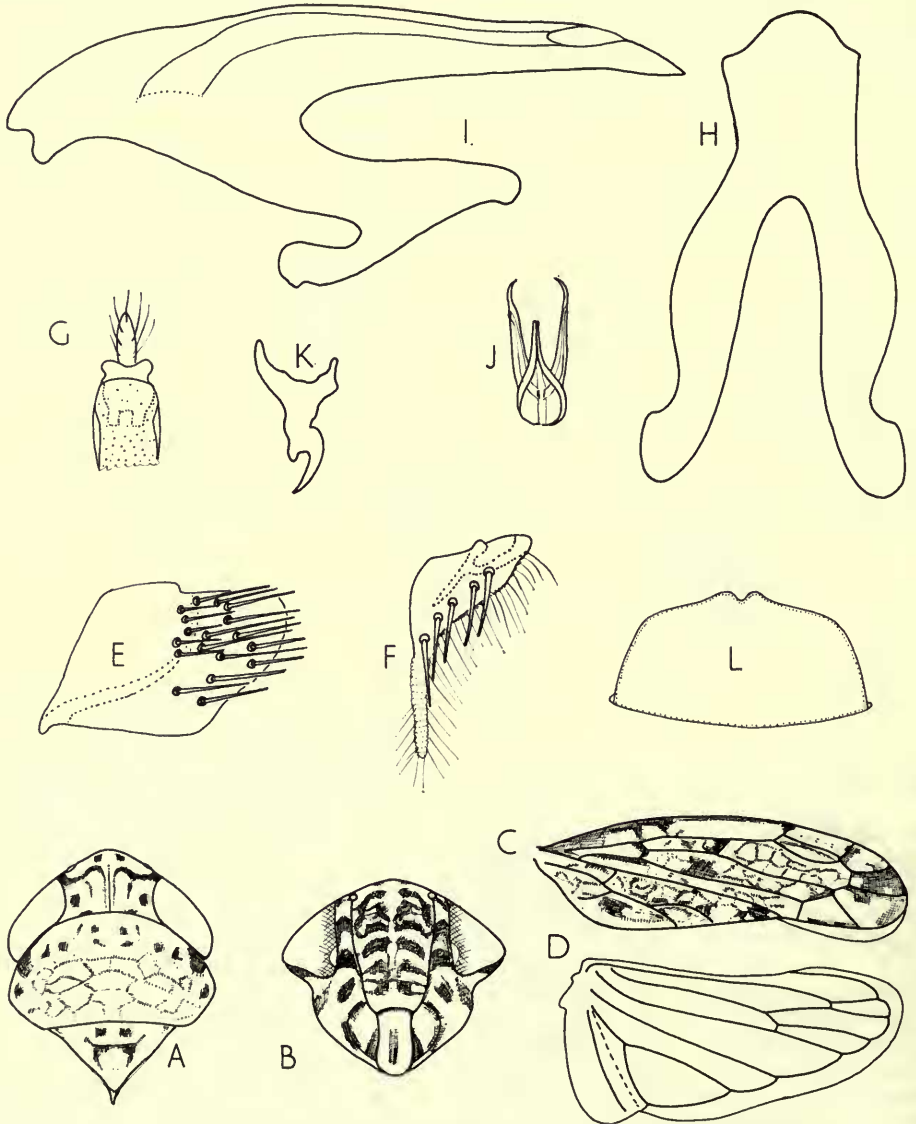


FIG. 7. *O. argentatus* (Evans) from Java. ♂ and ♀; for explanation of figures, see p. 252.

NORFOLK ISLAND : flying over large patch of *Ipomoea batatas* Lam., 1 ♂, 10.v.1939 (*I. McComish*), B.M. (N.H.).

FIJI : Viti Levu, Suva, 1 ♂, iii.1951 (*N. L. H. Krauss*), det. as *lotophagorum* Kirk. (= *argentatus* Ev.), Dr. R. Linnavuori Coll., Finland.

W. CAROLINE IS. : Paia I., 2 ♀, 28-29.iv.1954 (*J. W. Beardsley*), det. *Nesophrosyne* (*Orosius*) *argentatus* (Evans), Bishop Museum, Honolulu and Dr. R. Linnavuori Coll., Finland.

DANGER ISLAND : Motu Katava, 1 ♂, 1.iii.24 (*E. H. Bryan Jr.*), det. *Nesophrosyne argentatus* (Evans), Bishop Museum, Honolulu.

*O. argentatus* (Evans) has been confused with *O. lotophagorum* (Kirkaldy) in the past, but can be readily separated from the latter by its wider appendix and by the shape of its aedeagus, whose branches narrow gradually.

### *O. argentatus* (Evans) from Java

(Text-fig. 7)

*Coloration* : very similar to *O. argentatus* from Australia, but with reddish markings on face, tegmen and legs.

*Measurements in mm. of ♂ and ♀* : head, width across eyes 0.78-0.79 (0.86), width between eyes 0.31-0.32 (0.34), median length of vertex 0.24-0.27 (0.29), length of frons 0.49-0.51 (0.51-0.54), maximum width of frons 0.34 (0.37); width of pronotum 0.78-0.82 (0.88), median length of pronotum 0.41-0.43 (0.43-0.44), width at base of scutellum 0.41-0.47 (0.45), median length of scutellum 0.27-0.34 (0.34-0.42), length of tegmen 2.37 (2.53-2.58); body length 2.90 (3.16-3.21).

Specimens from Java are very similar to the nominate form from Australia, only differing in minor details—basal plate, with rectangularly narrow apex slightly more developed, aedeagus with lateral branches slightly diverging.

Material examined. WEST JAVA : Bogor, on *Arachis hypogea*, ♂, ♀, vii.1954 (*B. H. H. Bergman*), B.M. (N.H.).

### *Orosius argentatus novaebritanniae* ssp. n.

(Text-fig. 8)

*Coloration* : very dark, darker than most of the specimens of the nominate form from Australia, black markings, especially on frons, much more extensive and deeper in shade.

*Measurements in mm. of ♂ and ♀* : head, width across eyes 0.78 (0.81-0.84), width between eyes 0.29 (0.32-0.33), median length of vertex 0.24 (0.25-0.27), length of frons 0.47 (0.51), maximum width of frons 0.34 (0.34); width of pronotum 0.78 (0.81-0.82), median length of pronotum 0.41 (0.41), width at base of scutellum 0.54 (0.54), median length of scutellum 0.34 (0.37-0.41), length of tegmen 2.23 (2.23); body length, 2.76 (2.82-2.90).

Tegmen with wide appendix; pygofer with comparatively fewer setae; basal plate with slightly longer, rectangularly narrow apex and subparallel arms; aedeagus with lateral branches slightly diverging, but otherwise similar to those of *O. argentatus*; other parts of ♂ genitalia as figured.

Holotype ♂. NEW BRITAIN: Rabaul, Kerarat, 31.viii.1959, ex *Crotalaria gorensis* (*A. J. von Velsen*), B.M. (N.H.).

Paratypes: 2 ♀, with same data as holotype ♂.

Although the material examined is not adequate, the new subspecies can be distinguished from the nominate form by the shape of its basal plate, aedeagus and the colour of its body which is very dark.

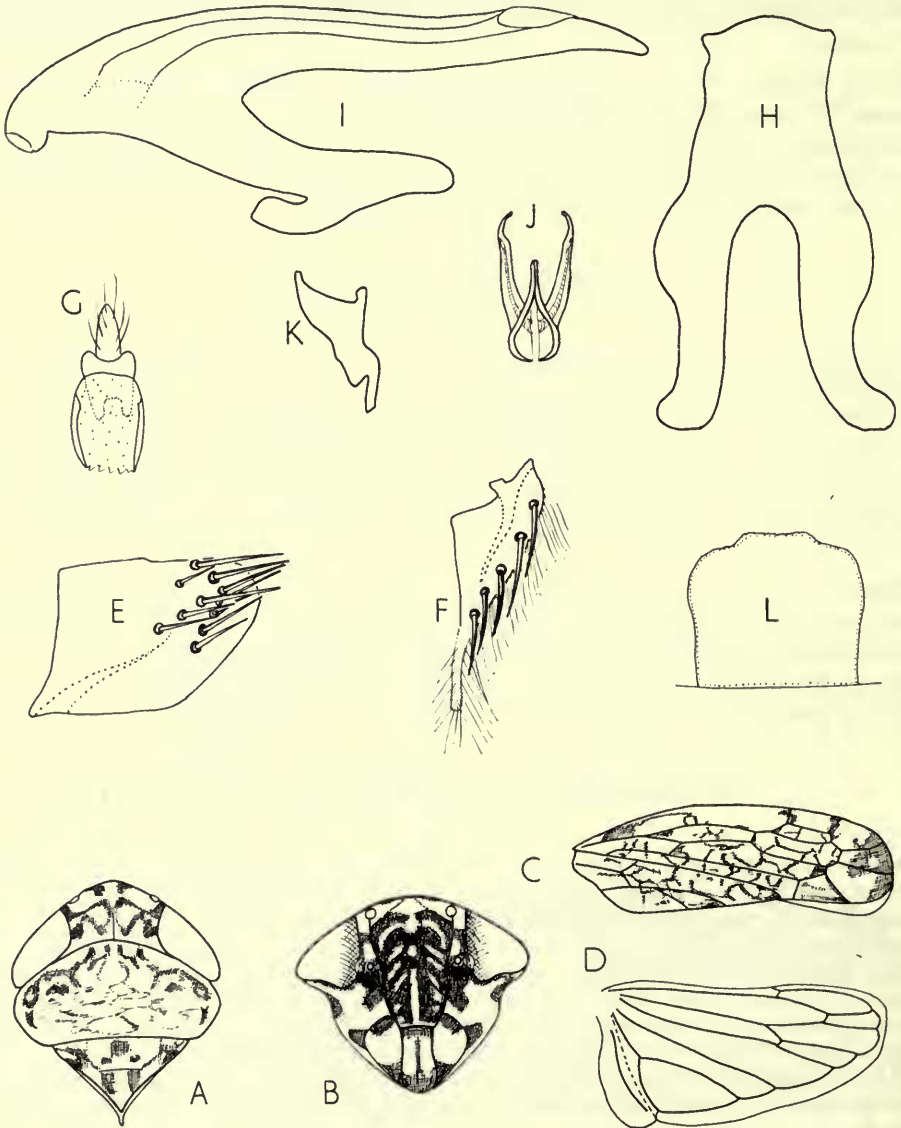


FIG. 8. *O. argentatus novaebritanniae* ssp. n. ♂ and ♀; for explanation of figures, see p. 252.



***Orosius cantonis* (Oman)**

(Text-fig. 9)

*Nesaloha cantonis* Oman, 1943b : 33.*Orosius cantonensis* (Oman) Linnavuori, 1960a : 56.

**Coloration** : general pattern of coloration similar to that of *O. albicinctus* Distant, but with fewer lighter markings.

**Measurements in mm. of ♂ and ♀** : head, width across eyes 0.76–0.78 (0.84–0.86), width between eyes 0.32 (0.34–0.36), median length of vertex 0.20 (0.24), length of frons 0.44 (0.49–0.51), maximum width of frons 0.32–0.34 (0.36–0.37); width of pronotum 0.74 (0.79–0.81), median length of pronotum 0.37 (0.41), width at base of scutellum 0.44–0.47 (0.44–0.51), median length of scutellum 0.30 (0.28–0.34), length of tegmen 2.10 (2.10); body length 2.63 (2.63–2.74).

Small and delicate leaf-hoppers; vertex rounded anteriorly, with anterior and posterior margins almost parallel, median length and length next to eye almost equal; tegmen with wide appendix; pygofers with numerous setae; basal plate with apex squarish and anterior arms slightly diverging; aedeagus with lateral branches slightly diverging, their apices curved inwards, in lateral view gradually narrowed and turned upwards like a "beak"; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin truncate in middle, with broad emargination on lateral angles, as shown in Text-fig. 9, L.

**Material examined.** CANTON IS. : Ex *Boerhaavia diffusa* L., 2 ♂, 1 ♀ paratype, I. viii. 40 (*Van Zwaluwenberg*); ex *Boerhaavia tetranda* Forst., 1 ♀, 26. ix. 1940 (*R. Damer*). ENIWETOK ATOLL : Eniwetok, *Portulaca quadrifida*, 2 ♂, 13. v. 46 (*Townes 61*); Aomon, swept grass, 1 ♂, 16. v. 46 (*Townes 218*); Eniwetok, Japtan, ex grass, 1 ♂, 17. v. 46 (*Oakley 112*). FASSARI I. : Uliathiat, 1 ♂, 10. vii. 46 (*H. K. Townes*, No. 1052). All material in U.S. National Museum, Washington, D.C.

Although the shape of the various parts of ♂ genitalia are broadly similar to those of *O. argentatus* (Evans), the small size of the body and the shape of its head with parallel margins of vertex separate *O. cantonis* (Oman) from all other species of the genus *Orosius*.

Recently Ishihara (1963 : 121–123) redescribed and figured *Eutettix orientalis* Matsumura (1914 : 192) as *Nesophrosyne orientalis* (Matsumura). From the figures it appears that the specimen belongs to *O. cantonis* (Oman). As the above-mentioned study by Ishihara is based on a Formosan material and not on the type or topotypic specimen, his conclusion cannot be accepted as final. As the type of *Eutettix orientalis* is not available at the moment, no further comments can be made.

***Orosius canberrensis* (Evans) comb. n.**

(Text-fig. 10)

*Thamnotettix canberrensis* Evans, 1938b : 15.

**Coloration** : pale ochraceous, bright, almost immaculate; eyes greyish; ocelli bright red.

**Measurements in mm. of ♂ and ♀** : head, width across eyes 0.88 (0.98–1.00), width of vertex between eyes 0.35 (0.42–0.44), median length of vertex 0.25 (0.27), length of frons 0.54 (0.63), maximum width of frons 0.37 (0.45–0.47); width of pronotum 0.88 (0.98–1.00), median length of pronotum 0.47 (0.47–0.49), width at base of scutellum 0.51 (0.54–0.57), median length of scutellum 0.37 (0.41), length of tegmen 2.71 (2.76); body length 3.29 (3.42–3.45).

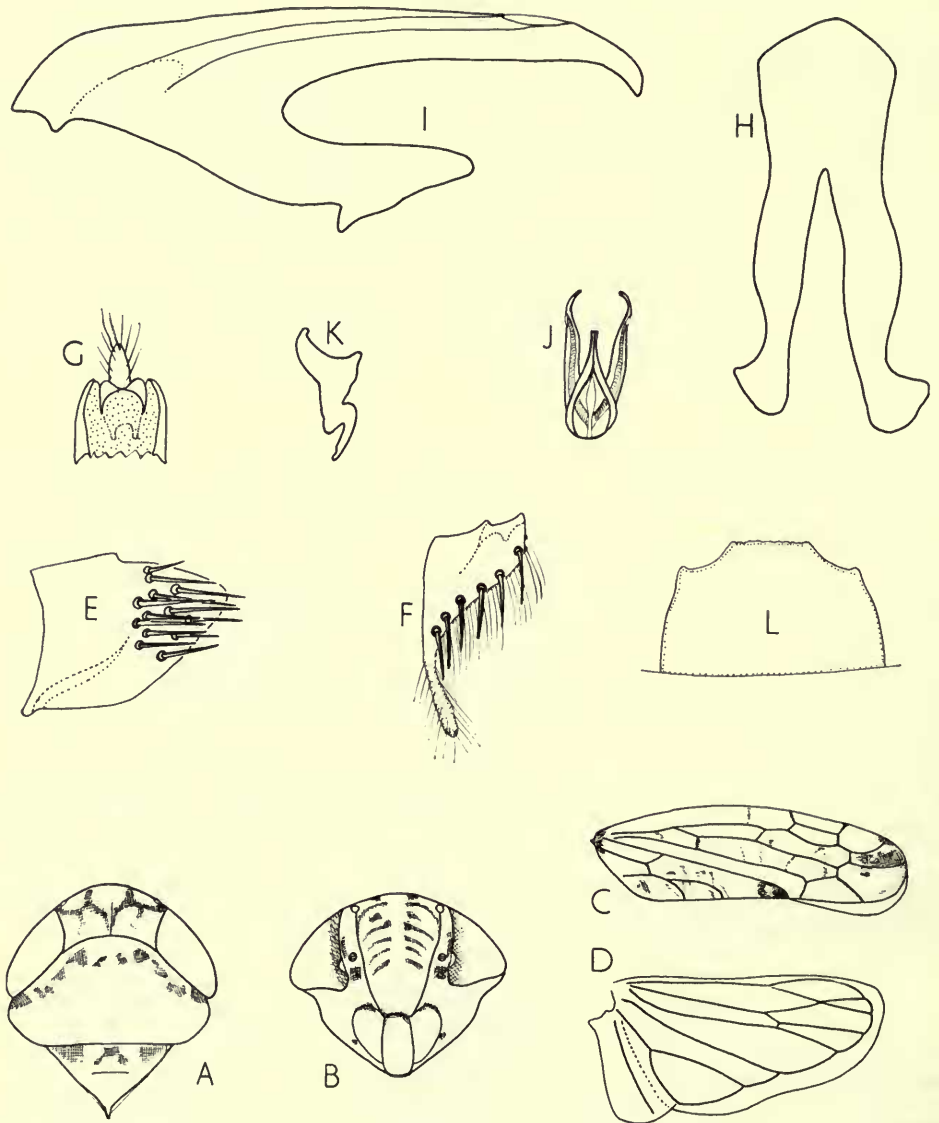


FIG. 9. *Orosius cantonis* (Oman). Paratype ♂ and ♀; for explanation of figures, see p. 252.



FIG. 10. *Orosius canberrensis* (Evans). ♂ and ♀; for explanation of figures, see p. 252.

*Orosius canberrensis* (Evans) is the largest species of the genus *Orosius*, with robust body, very wide head and the vertex with anterior and posterior margins almost parallel; pronotum short; pygofers with numerous setae; basal plate with rectangularly narrow and long apex and parallel anterior arms; aedeagus with lateral branches comparatively short and widely parallel, without their apices much produced beyond gonopore as seen in lateral view; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin bulging slightly in middle.

Material examined. AUSTRALIA: Canberra, F.C.T., 1 ♀ paratype, 1 ♂, Mar., 1930 (*J. Evans*), B.M. (N.H.); Broken Hill, N.S.W., 1 ♀, iii. 1924 (*F. W. Shepherd*), Australian Museum, Sydney.

The large size, immaculate coloration, parallel-sided vertex, very long apex of basal plate and the short lateral branches of its aedeagus readily separate *O. canberrensis* (Evans) from other species of *Orosius*.

### *Orosius aegypticus* sp. n.

(Text-fig. 11)

*Coloration*: general body colour similar to that of *O. albicinctus* Dist.; vertex and pronotum with fewer dark markings, frons and other parts of face with scanty light brown markings, ocelli reddish yellow; ovipositor reddish.

*Measurements in mm. of ♂ and ♀*: head, width across eyes 0.88 (0.91), width between eyes 0.37 (0.35), median length of vertex 0.32 (0.34), length of frons 0.61 (0.62), maximum width of frons 0.37; width of pronotum 0.91 (0.95), median length of pronotum 0.42 (0.42), width at base of scutellum 0.53 (0.54), median length of scutellum 0.37 (0.40), length of tegmen 2.55 (2.63); body length 3.10 (3.21).

Vertex somewhat flat, wider and longer than most other species; tegmen with wide appendix; pygofers with fewer setae. Basal plate very small compared to other species of *Orosius*, stem reduced, giving it the shape of a "U" rather than that of a "Y"; aedeagus with parallel branches in lateral view showing their sudden narrowing from the globular base; other parts of the ♂ genitalia as figured; ♀ VII sternum with a shallow, wide emargination on the hind margin.

Holotype ♂. EGYPT: Siwa, 12.v.1935, (*J. Omer-Cooper*), Armstrong College Expedition B.M. 1935-354, in B.M. (N.H.). Holotype ♂ bearing a determination label *Orosius cellulosus* Ldbg. by W. Wagner, 1955.

Paratypes. Several ♀, same data as holotype.

This species is characterised by its flat vertex, smaller basal plate, form of aedeagus and style, by which it differs from all other species of *Orosius*.

The status of the new species should be considered, however, as tentative. Since only a single ♂ was available, the shape of the genitalia and that of the vertex could not be confirmed by reference to a second ♂. The holotype ♂ might be a diseased specimen although no signs were found to suggest this.

#### KEY TO THE SPECIES OF *OROSIUS*

- |   |   |                                      |
|---|---|--------------------------------------|
| 1 | Anterior and posterior margins of vertex parallel . . . . .     | 2                                    |
| — | Anterior and posterior margins of vertex not parallel . . . . . | 3                                    |
| 2 | Body immaculate . . . . .                                       | <i>canberrensis</i> (Evans) (p. 247) |

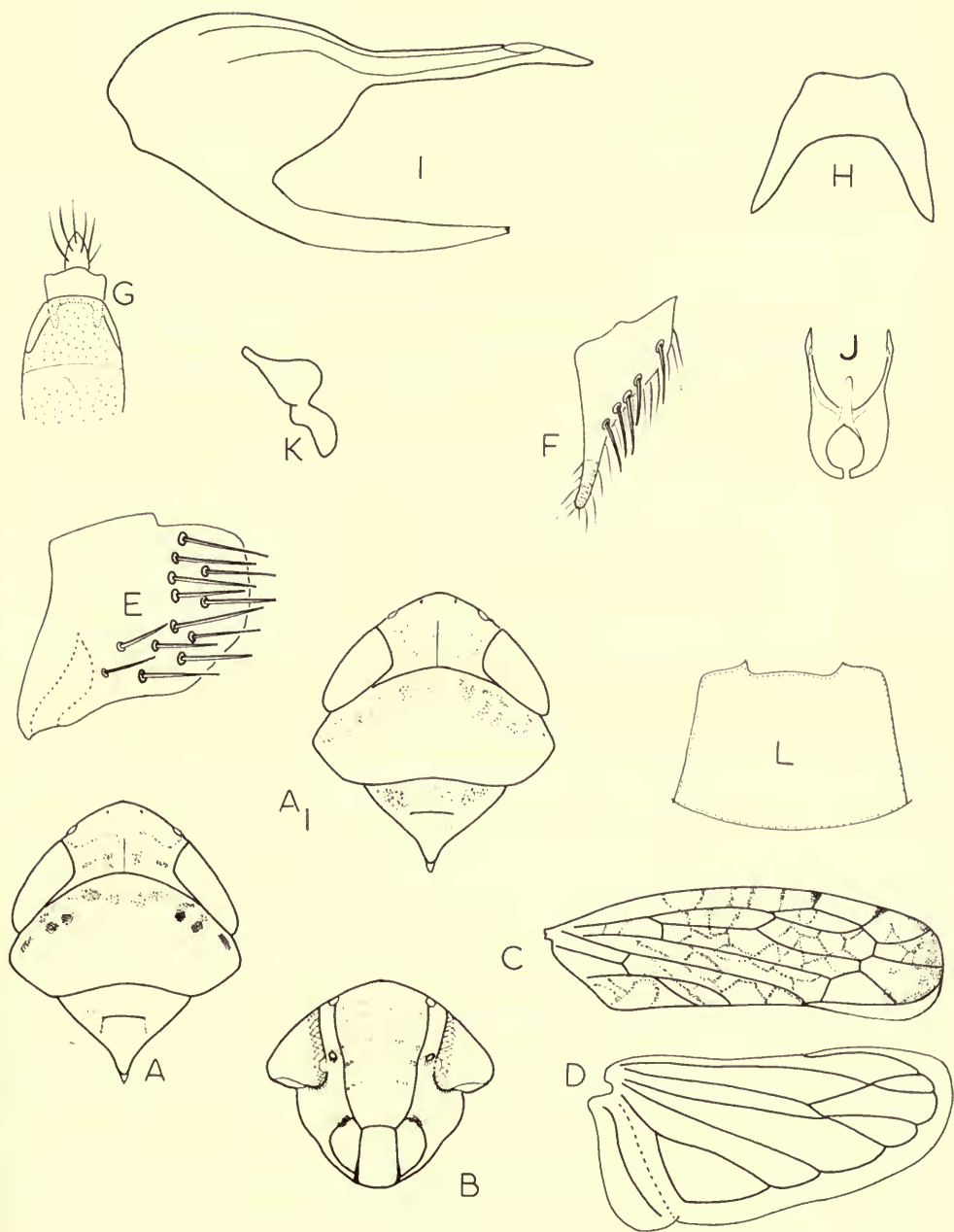


FIG. 11. *Orosius aegypticus* sp. n. Holotype ♂ and paratype ♀; A<sub>1</sub> and L belong to female, the others to holotype male; for explanation of figures, see p. 252.



- Body with dark markings . . . . . *cantonis* (Oman) (p. 247)
- 3 Body robust, appendix of tegmen narrow, apex of aedeagus beyond gonopore abruptly produced as a narrow process . . . . . *lotophagorum* (Kirkaldy) (p. 241)
- Body of moderate size, appendix of tegmen broad, apex of aedeagus variously narrowed, but never abruptly so . . . . . 4
- 4 Body of basal plate reduced to a transverse “bar”, (stem of “Y” absent) . . . . . *egypticus* sp. n. (p. 250)
- Body of basal plate developed (stem of “Y” triangular or rectangular) . . . . . 5
- 5 Body of basal plate triangular, branches of aedeagus widely divergent . . . . . *albicinctus* Distant (p. 236)
- Body of basal plate rectangular, branches of aedeagus parallel or sub-parallel . . . . . 6
- 6 Shaft of aedeagus sinuate . . . . . *cellulosa* (Lindberg) (p. 239)
- Shaft of aedeagus not sinuate . . . . . 7
- 7 Brown markings on body not extensive, normal, like most of the other species of *Orosius* . . . . . *argentatus* (Evans) (p. 242)
- Brown markings very extensive, body dark brown . . . . . *argentatus novaebritanniae* ssp. n. (p. 245)

## LETTERING USED IN TEXT-FIGURES

A and A <sub>1</sub>	dorsal view of head and thorax	G	dorsal view of anal tube
B and B <sub>1</sub>	ventral view of head and thorax	H	dorsal view of basal plate
C and C <sub>1</sub>	tegmen	I	lateral view of aedeagus
D and D <sub>1</sub>	wing	J	dorsal view of aedeagus
E	lateral view of pygofers	K	dorsal view of style
F	ventral view of subgenital plate	L	ventral view of ♀ VII sternum

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